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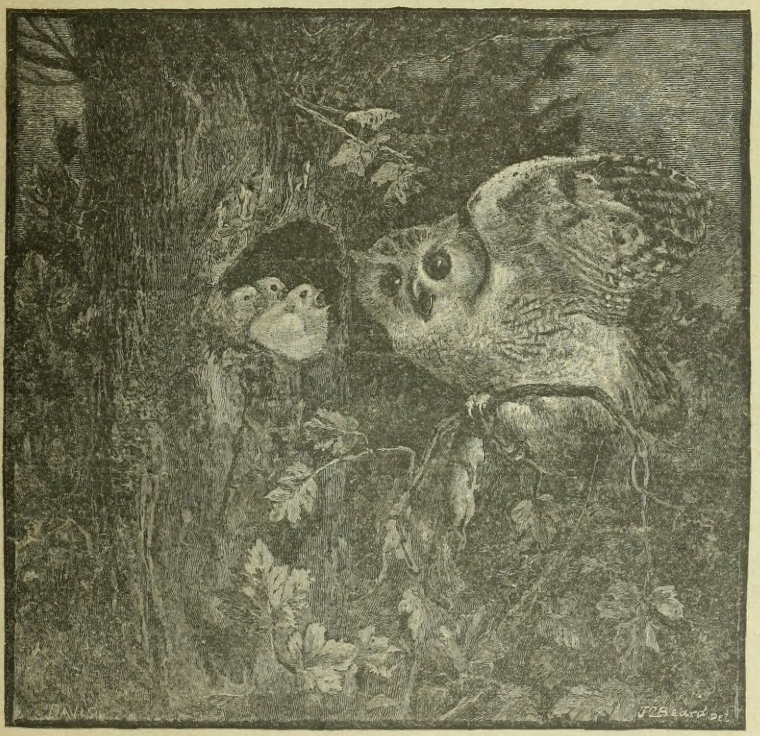
BIRDS

VISITORS' GUIDE

TO THE

COLLECTION OF BIRDS.



American Museum of Natural History,

Seventy-seventh Street and Eighth Avenue,

NEW YORK CITY.

FOR SALE AT THE MUSEUM.

PRICE, FIFTEEN CENTS.

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IN THE

AMERICAN MUSEUM OF NATURAL HISTORY,

Seventy-seventh Street and Eighth Avenue,

NEW YORK CITY.

J. A. ALLEN, Curator.

Smithsonian Institution
325777
National Museum

New York:
PRINTED FOR THE MUSEUM.

1888.

GOLDEN HILL
WM. C. MARTIN.
111 JOHN ST.
Established 1835. NEW YORK
PRINTING HOUSE

598.73
N7A527

COLLECTION OF BIRDS.*

INTRODUCTORY.

The collection of birds exhibited in the Bird Hall numbers about 11,000 specimens, of which 3000 are North American, 3000 South American, and about 5000 from the Old World. The collection consists chiefly of three important collections purchased by the Trustees in 1869–70. These are (1) the Elliot Collection of North American birds, received as skins and subsequently mounted by the well-known taxidermist, John G. Bell, of this city. (2) The Maximilian Collection, consisting of about 4000 mounted birds, from various parts of the world, but mostly European and South American. The greater part of the South American birds now on exhibition are from the Maximilian Collection, and include many types of species described by Prince Maximilian.† (3) The Verreaux Collection, consisting of about 3000 mounted birds, selected with great care by Mr. D. G. Elliot from the immense stock of the celebrated French commercial naturalists, the Verreaux Brothers, of Paris. In addition to these collections, many specimens have been purchased to complete the North American collection, chiefly from Prof. H. A. Ward, of Rochester, New York.

ARRANGEMENT OF THE COLLECTION.—The North American birds occupy Cases B to F on the east side of the Hall, forming

* The attention of the visitor is especially called to the ALPHABETICAL INDEX at the end of the Guide, where are given not only the English and scientific names of all the principal groups of birds in the collection, but a reference to their position in the cases and to the page in the Guide where they are mentioned.

† Maximilian, Prince zu Wied-Neuwied, Germany (born 1782, died 1867), was a well-known traveller and naturalist. In 1815–17 he travelled extensively in Brazil, exploring the country in the interest of natural history, forming large collections, and subsequently publishing (1825–33) an elaborate work giving the results of his researches, four volumes of which were devoted to birds. He made a natural-history journey through North America in 1832-34, going as far into the then almost unexplored West as the Upper Missouri. Many of the birds collected on that expedition are in the present collection.

a faunal collection of the birds of the United States and the region thence northward to Greenland and the Arctic Ocean. Nearly every species and subspecies known from "North America," as thus limited, is represented by one or more specimens.

The "South American" birds occupy the remaining cases (F to J) on the east side of the Hall, and include the birds from Mexico, the West Indies, and Central America, as well as South America.

The Old World birds occupy all of the cases on the west side of the Hall. Each collection is arranged systematically, or in accordance with the classification adopted in the present Guide. The series, beginning at the north end of the Hall, starts with the Song Birds, the "highest" or most specialized group, and ends with the lowest, which in the North American birds are the Auks, Loons, and Grebes, and in the South American and Old World the Penguins and Struthious Birds, these groups being respectively the "lowest" or most generalized. With the Old World birds are arranged many New World birds—duplicates of species also represented in the North American and South American collections. The series on the west side of the Hall is thus to a certain degree a general systematic collection of the birds of the world, although consisting principally of Old World species.

In the present Guide the sequence of groups accords with the growing custom, and by far the most rational system, of beginning with the lowest or most generalized forms and ending with the highest or most specialized in any system of zoölogical classification. As the main entrance to the Hall will, with the completion of the present addition at the Seventy-seventh Street end of the building, be at the western end of the Hall, the arrangement of the Guide will be also that of the birds in the cases.

Besides the mounted birds in the large cases, the Bird Hall contains a series of separate groups of birds, mounted with their nests and natural surroundings, which will be found described at length at the end of the Guide (pp. 59–62). Also a series of cabinets containing the collection of nests and eggs. These occupy the first four alcoves on the east side of the Hall, between the cases numbered A to F. Glass cases resting on the tops of

these cabinets contain a selected series of the nests and eggs, for exhibition. Owing to the rapid injury of eggs by exposure to light, the greater part of the collection is stored in the drawers of the cabinets, in order to preserve them from more or less rapid deterioration.*

In addition to the birds on exhibition in the Bird Hall, the Museum has a Study Collection, consisting of unmounted skins, stored in the Curator's rooms on the Fifth Floor. In extent and value it is the second in importance in America. It numbers about 30,000 specimens, selected with special reference to their scientific value, authoritatively determined, and including many hundred original types. It forms a reserve collection for scientific research and for the use of specialists. The collection is made up mainly as follows: (1) the Lawrence Collection, consisting of about 12,000 specimens, mostly from Mexico, Central America, South America, and the West Indies; (2) the Elliot Collection of Hummingbirds, numbering about 2000, and one of the finest of its kind in the world; (3) the Smith Collection, 4000 specimens, from the Province of Matto Grosso, Brazil; (4) the Scott and Mearns Collections of Arizona birds, about 6000 specimens. Also several thousand North American, South American, European, and East Indian specimens, besides a private collection of over 5000 birds, belonging to Mr. George B. Sennett, which, by his kindness and courtesy, is also available for use in scientific work.

Explanation of Terms.—A few words explanatory of certain terms relating to classification used in the following pages may not be out of place.

The word *group* in classification has no technical standing, being merely a convenient term to indicate collectively a series—individuals, species, or genera, as the case may be, and varying in number from two or three to many, as the context may indicate. On the other hand, the terms *kingdom*, *branch*, *province*, *class*, *order*, *suborder*, *family*, *genus* (plural, *genera*), *species*, and *subspecies*, have each a definite signification, and are always used in the same sense. For example, birds belong to the Animal Kingdom

* The collection of Monkeys, at present exhibited in the Bird Hall, is deposited here temporarily, awaiting place in the Mammal Hall when the addition to the building is completed.

(*Animalia*), and to the Branch of Vertebrates (*Vertebrata*), and, combined with reptiles, form the Province *Sauropsida*, of which they constitute a Class (Class *Aves*). The class is divided into orders, the orders into suborders (sometimes termed superfamilies), the suborders into families, the families into subfamilies, the subfamilies into genera, the genera into subgenera, the subgenera into species, the species into subspecies, "varieties," local races, or geographical forms, etc., these latter terms being merely different names for what naturalists usually designate as subspecies, and which are made up of closely-related individuals.

These groups, in the order named, form a descending series, and their order of sequence can never be inverted or transposed—that is, families cannot be divided into orders, nor genera into families, etc. Between these groups, however, there are no hard-and-fast lines; oftener than otherwise contiguous genera, families, or orders so nearly merge into each other that their limits are more or less conventional, and fluctuate with the opinions of different authors as to the value of certain generally recognized differences. In many instances, however, they stand out with great distinctness as well circumscribed groups.

The size of these groups has nothing to do with their status; an order may have a thousand species or only one, the sole species constituting it being so different from all other species that its differences are of a character or grade termed ordinal. Such an order can have, of course, only one family and only one genus.

If we knew all the forms of bird life which have ever lived all the gaps between the different groups, from species to orders, could be readily filled, and it would be easy to arrange all the various forms, living and extinct, along certain lines of descent, converging, like the branches of a tree, toward a common ancestral stock, originating far back in the geologic ages. We should then know the relationship and the history of forms now puzzling; but as such knowledge is plainly never to be attained, our systems of classification must ever be tentative, and expressions of our ignorance of the real history of bird life far more than of positive knowledge. Yet in order to study birds some system of arrangement is absolutely necessary. The one here presented is in the main a fair expression of average opinion on the subject.

Explanation of the Labels.—The labels attached to the specimens give, besides their English and scientific names, the locality where the specimen was taken, and generally the sex and age, when the sexes greatly differ in color or size. The number at the upper left-hand corner of the label is the number of the specimen as entered in the Museum Register ; the words in the opposite corner, as "Maximilian Collection," "Elliot Collection," "Verreaux Collection," etc., indicate the source from which the specimen was obtained. In most cases where the specimens were presented the donor is credited with the gift at the lower left-hand corner of the label.

The authority given for the scientific name is always that of the original describer of the species; when the author's name is inclosed in parenthesis the inclosure means that the species was originally referred to some genus other than that in which it is now placed.

The North American birds are labeled and arranged in accordance with the "Code of Nomenclature and Check-List of North American Birds," prepared by a Committee of the American Ornithologists' Union, and published by the Union in 1886. The South American and Old World birds are labeled (as far as labels have been prepared) in accordance with the latest authoritative works and monographs relating to the birds in question.

For the cuts illustrating the present Guide the Museum is indebted to Messrs. Estes & Lauriat, of Boston, and the Century Company, of this city. Figures 1, 4, 5, 14, and 17, are from Dr. Coues's "Key to North American Birds," published by Estes & Lauriat ; figures 2, 3, 6–13, 15, 16, and 18 are from the "Century" Magazine and "Sport with Gun and Rod," published by the Century Company.

CLASSIFICATION AND DESCRIPTION OF THE COLLECTION.

WHAT IS A BIRD?—A bird may be defined as a feathered vertebrate, or a feathered animal with a backbone. Birds, as we ordinarily see them, look so different from all other animals that it would seem easy to give a long list of characters, any one of which would serve to distinguish them from mammals, reptiles, and fishes; yet their only exclusively distinguishing character is their feathers. Birds, it is true, possess horny beaks, and are without teeth, yet some of the early forms of birds had teeth; and turtles, as well as birds, have a horny beak. Birds lay eggs; and so do nearly all reptiles and fishes, and some mammals.

In the ordinary bird there is nothing suggestive of reptilian affinities. Yet birds have not only unquestionably descended from reptilian ancestors, but to-day find their nearest relatives in the scaly, creeping saurian. Birds are so much more nearly related to reptiles than they are to mammals that naturalists now combine them as one of the three grand divisions of Vertebrates, under the name *Sauropsida* (reptile-like animals), in contrast on the one hand with mammals (*Mammalia*), and on the other with frogs, newts, salamanders, and fishes, collectively termed *Ichthyopsida* (fish-like animals). The connecting links between birds and reptiles, however, are furnished, not by existing forms, but by extinct types of both birds and reptiles, the early types of birds presenting many reptilian features not shown by living birds, while some of the extinct reptiles were more bird-like than any now existing.

While birds are distinctively characterized by their feathers, they may also be further defined with considerable accuracy as warm-blooded, egg-laying, flying vertebrates. It having been recently discovered, however, that the Duck-billed Platypus and the Echidnas, which are true mammals, lay eggs, this long-current

definition of birds proves defective. Furthermore, bats fly as truly as birds, and some fishes and reptiles possess imperfect flight, while the pterodactyles—an extinct order of reptiles—were as much flying vertebrates as either bats or birds. But the mechanism of flight in birds is strictly distinctive, the apparatus of flight consisting of a special modification of certain feathers growing upon the fore-limbs. If we compare the wing of a bat or pterodactyle with the wing of a bird, we find that all the bones of the arm and hand are lengthened, to give support to the parts concerned in flight, but that here the resemblance ceases; the wing of the bat, as was the case with the pterodactyle, consisting of a naked leathery membrane joined to the sides of the body and to the arm, and supported by the long slender fingers of the hand; while in the bird the means of support consists of a series of long, stiff, broad feathers, attached to the arm and hand, which latter consists practically of a single finger, giving support to the primary wing feathers.

In respect to internal structure, birds possess many characters common to mammals, and others which they share only with reptiles; in other words, most of the characters which distinguish birds from mammals are equally common to reptiles. Birds may, however, be distinguished from mammals by the absence of milk glands for the nourishment of their young; and from reptiles by a complete double circulation of the blood.

As already said, the only feature serving to distinguish birds from all other vertebrates is their covering—feathers. This seemingly superficial and unimportant character is a modification of the skin appendages covering the body in strict correlation with the adaptation of the whole organism to aërial locomotion, the whole structure being specialized to this end. The skeleton, the muscles, the position of the internal organs, the manner of reproduction, the covering—all are profoundly specialized to enable birds to fly. The form of the body is adapted to easy passage through the air, having, so to speak, the form of two cones joined base to base, the neck and head forming the apex of one and the tail the apex of the other. The covering of feathers gives everywhere a smoothly rounded contour, effectually concealing all angularities of the body. The feathers themselves are directed

backward and overlap each other like the shingles on a house. While presenting a more or less firm and smooth exterior, their lower portions are open and downy, thus combining lightness with warmth, and forming a non-conducting medium admirably adapted to conserve the heat of the body. The long feathers forming the wings and tail are so arranged as to form exceedingly light but effective instruments of flight, the wings presenting a smooth, strongly resisting surface to the air in the downward stroke, while the tail serves the purpose of a rudder. The wings are attached to the portion of the body affording the best leverage; the skeleton is constructed to afford the greatest possible strength and firmness to the shoulder, and for the attachment of the immense breast muscles that move the wings. For this purpose the breast-bone or sternum is broad, long, and strongly keeled, and all the bones entering into the scapular arch are firmly bound together and to the thorax. The bones are hollow, admirably combining lightness and strength, while air cavities are situated in various parts of the body, to further lesson specific gravity. The muscles which move the wings exceed in bulk all the other muscles together, and sometimes nearly outweigh the remaining portion of the body. Even the provision by which birds lay eggs to be hatched by incubation has also reference to the function of flight. If birds carried their young, as mammals do, until ready to be born alive, their weight would so far impair the bird's bouyancy as to greatly impede flight.

As the anterior limbs of birds are exclusively specialized for flight, the hind limbs are equally so for walking and grasping, being the only animals except man perfectly adapted to bipedal locomotion.

Subclasses.—Birds (Class *Aves*) are divided into four subclasses, only one of which has living representatives, namely, the *Eurhipidurœ*.

Saururœ.—The first Subclass, *Saururœ* (lizard-tailed birds), consists of the single genus *Archæopteryx*, known as yet only from a very few specimens discovered in the lithographic slate of Solenhofen, Bavaria, a formation belonging to the Upper Jura. It was first made known from a single feather, found in 1861, by

the distinguished palæontologist Hermann von Meyer, and the bird thus brought to light he named *Archæopteryx lithographica*. In 1863 Professor Richard Owen described a specimen from the same deposits, consisting of the pelvis, hind-limbs, tail, some detached bones of the fore-limb, and part of the wing-feathers. (See Fig. 1.) In 1877 another specimen was found, much nearer com-

Fig. 1. The first discovered specimen of the Archæopteryx.

plete, the parts lacking in the first specimen being in this especially well preserved. (See Fig. 2.) The Archæopteryx is the oldest bird known, and supplies one of the missing links between birds and reptiles, although decidedly a bird rather than a reptile. It was about the size of a Crow, was provided with teeth, and had a very long tail—nearly as long as the body—consisting of about twenty long, slender vertebræ, with feathers growing from the

sides. The tail was thus very unlike the tail of a modern bird, in which the feathers are seated in a single transverse row, on the last joint of the series of seven or eight very short vertebræ, which barely project beyond the body. The skeleton of the Archæopteryx presents many reptilian features, which it is unnecessary to detail in the present connection. The restoration shown in Fig. 3 gives a hypothetical representation of the appearance of this "early bird."* It is probable, however, that the head and neck were not so bare of feathers as here represented.

Fig. 2. The second discovered specimen of the Archæopteryx.

Odontotormæ. — The second Subclass, *Odontotormæ* (toothed birds with the teeth in sockets), consists of several genera, represented by parts of the skeletons of some eighty individuals, discovered by Prof. O. C. Marsh, of New Haven, in the Middle Cretaceous of Kansas and Colorado, during the years 1871–72, and later. Like the Archæopteryx, they were toothed birds, with biconcave vertebræ, and other reptilian features, but with well-

* This cut is after a design by Dr. R. W. Shufeldt, published in the "Century" Magazine for January, 1886, in an article entitled "Feathered Forms of other Days."

Fig. 3. Restoration of the Archæopteryx.

developed wings and a keeled sternum, and a tail like that of ordinary birds. They were rather small birds, in size and general form suggestive of the common Tern, which they may have some-

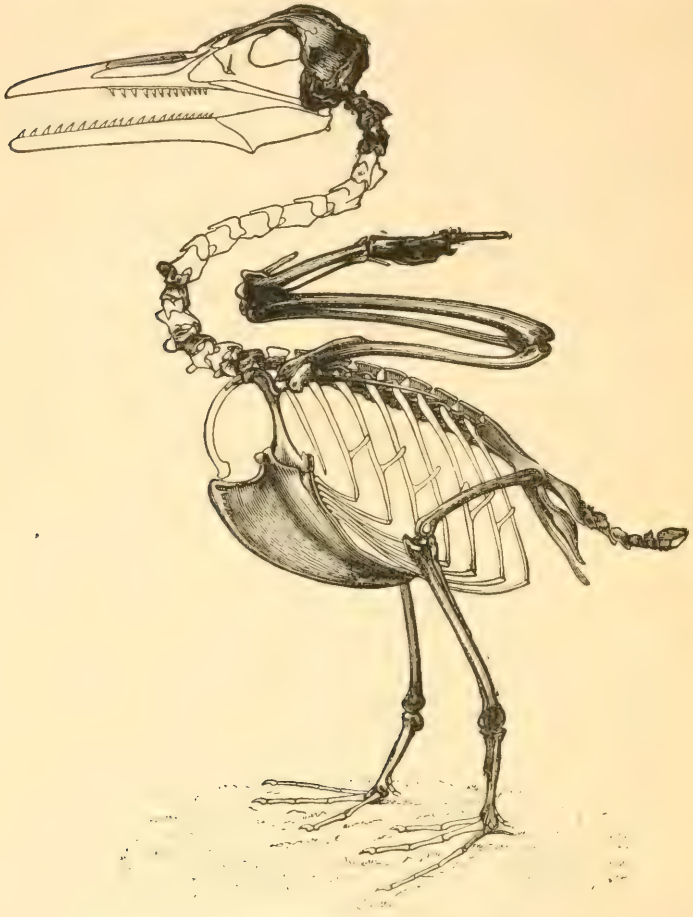

Fig. 4. Restoration of the skeleton of Ichthyornis. The restored portions are unshaded.

what resembled in habits, being aquatic, and furnished with powerful wings and small feet and legs.

Fig. 4 represents a restoration of the skeleton of one of the species (*Ichthyornis dispar*), by Professor Marsh.

Odontolcæ.—The third Subclass, *Odontolcæ* (toothed birds with teeth in grooves), are from the same geological formation and from the same region of country as the last, and were made known by

Fig. 5. Skeleton of Hesperornis.

the same distinguished naturalist, between the years 1870 and 1880. The birds forming this subclass were short-winged diving birds, with rudimentary wings and a sternum without a keel. So many complete skeletons of these birds have been found that

their bony structure is as well known as that of modern birds. Especially is this the case with the genus *Hesperornis* (western bird), the best known species of which, *H. regalis* (the royal western bird), would stand about three feet high, with a general resemblance to a Loon or Grebe. In many points Hesperornis strongly

Fig. 6. Restoration of Hesperornis.

resembles some modern birds, but in other features shows unmistakably its reptilian ancestry.

Casts of some of the principal bones of Hesperornis may be seen in Alcove Case No. 13 of the Geological Hall.

Fig. 5 gives a figure of the skeleton (after Marsh), and Fig. 6 a hypothetical representation of its external appearance, by Dr.

R. W. Shufeldt, U. S. A., one of our most eminent avian anatomists.

Professor Marsh published, in 1880, an elaborate memoir on the toothed birds, under the title "Odontornithes : a Monograph on the Extinct Toothed Birds of North America," a large quarto volume, illustrated with thirty-four large plates and numerous wood cuts.

Eurhipiduræ. — The fourth Subclass, *Eurhipiduræ* (fan-tailed birds), comprises all living birds, together with some extinct forms, and is divided into numerous orders and families. The "lowest," or least specialized, is

Order I, *Struthiones*, consisting of the Ostriches, Rheas, Cassowaries, Emeus, and Moas. The birds of this order are especially remarkable for the great development of their legs and the rudimentary condition of their wings. They are preëminently walking birds, and are also incapable of flight, their wings merely aiding them somewhat in running. The wing muscles are thus rather slightly developed, and there is no keel to the sternum, which is merely a flat buckler, as shown in the skeleton of the Rhea, or South American Ostrich, in Case K. The Struthious birds belong to a waning type, and are now confined to the southern continents, though formerly inhabiting Europe and North America, where the fossil remains of several extinct species have been found. The Ostriches (family *Struthionidæ*) are confined to Africa, and until recently were all considered as belonging to a single species (*Struthio camelus*), represented in Case K. Two other forms have been recently recognized, but the differences are slight and of doubtful importance as specific characters. Ostriches live in small flocks, are exceedingly wary, and rely on their keen sight and extreme fleetness of foot to escape their enemies.

The Rheas or Nandus (family *Rheidæ*) are the so-called Ostriches of South America. They are much smaller than the true Ostriches, have three toes instead of two, and lack the beautiful plumes which have made the African Ostriches so much admired, and which have finally led to their domestication and introduction into Buenos Ayres, California, and other parts of our own country for

purposes of profit. There are three well-marked species of Nandus, all confined to southern South America, ranging from central Brazil to southern Patagonia. Darwin's Nandu (*Pterocnemis darwini*) is found only in Patagonia. It is smaller than the common Nandu (*Rhea americana*), and otherwise different. A specimen of the latter may be seen in Case J.

The Emus (family *Dromaiidæ*) number only two species, and inhabit Australia. Like the Ostriches and Rheas, they are emphatically birds of the plains. The Emus have the wings extremely rudimentary, the wing feathers being reduced to mere spines. The fossil remains of an extinct species have been found in India, showing that formerly the Emus had a much wider range than they now have.

The Cassowaries (family *Casuariidæ*) have a very restricted distribution, being mainly confined to New Guinea and the neighboring Papuan Islands, a single species only of the ten commonly recognized being found in North Australia. Several of the species are each confined to single small islands. Like the Emus, the Cassowaries have very rudimentary wings, in which the flight feathers are represented by horny spines. They are remarkable for the horny casque or helmet surmounting the head, and the brilliantly colored naked skin and wattles about the face. The species much resemble each other, and inhabit dense forests or thick scrub. The group is represented by a single specimen in Case K.

The Moas (family *Dinornithidæ*, sometimes recognized as an order, *Immanes*) are an extinct group of Struthious birds, formerly inhabiting New Zealand and portions of Australia. The date of their extinction is comparatively recent, there being some evidence that they existed in New Zealand when the Maoris, by whom they were probably exterminated, migrated to that island. They are of special interest in many ways, supplying the link between the Kiwis and the Ostriches. Their wings were rudimentary, and their hind limbs massive. About fifteen species are recognized, differing so greatly in form and size as to be referred to several genera. Three and a half tons of their bones have been found at a single locality, representing, it is estimated, about four hundred skeletons; other large deposits have been found at other

points. A good idea of this group of birds may be obtained by an inspection of the skeletons in the Geological Hall, where may be found one of the finest series extant in any museum.

Order II, *Æpiornithes*, consists of the extinct gigantic birds of Madagascar; the larger, called *Æpiornis maxima*, was of about the height of a large African Ostrich. It is known only from portions of its skeleton and its eggs, found in a fossil state. Its bulk must have been enormous, its egg being six times as large as an Ostrich's egg, and equal in capacity to 150 hen's eggs. A cast of one of its eggs may be seen in Case T of the Geological Hall.

Order III, *Apteryges*, consists of the singular looking Kiwis, of which four species are known, all inhabiting New Zealand. As their Latin name (*Apteryx*) implies, they are practically wingless, the wings being reduced to mere rudiments. They are also tailless. Their feathers are narrow and bristly, and the bill is long and Snipe-like, with the nostrils situated near the tip. Several examples of these highly grotesque birds may be seen in Case K.

Order IV, *Crypturi*, is a peculiar group of South American birds, the Tinamous, numbering about fifty species, and occurring from Costa Rica southward to Paraguay. They are ground birds, of weak flight, allied in many features to the Ostriches, Rheas, and Cassowaries. Several species are represented in Cases J and K.

The name *Gastornithes* is given to a group (questionably of ordinal value) of extinct, gigantic, little-known birds, whose fragmentary remains have been found in Europe and in New Mexico.

Order V, *Impennes*, or *Ptilopteri*, comprises the single family (*Spheniscidæ*) of Penguins—aquatic, flightless birds, restricted to the coasts and islands of the southern continents, and mainly to their southern borders. In South Africa they are not known to range further than 25° south lat.; nor beyond 35° south lat. in Australia. In South America they reach the Galapagos Islands on the west coast, and Ascension Island on the east coast, with the Falkland Islands as their principal metropolis. On the land

they are awkward and ungainly, but in the water they are extremely agile, swimming with their wings when beneath the surface and using their feet as a rudder. Of the dozen species commonly recognized, several are represented in Cases J and K.

Order VI, *Pygopodes*, includes four well-marked families of diving birds—the Grebes (family *Podicipidæ*), the Loons (family *Urinatoridæ*), and the Auks (family *Alcidæ*). The Grebes are tailless, small-winged divers, with the toes lobated instead of webbed, and with many peculiarities of internal structure. They are among the most expert of diving birds, number about thirty species, and are represented in nearly all parts of the world. The North American species will be found in Case F, the South American in Case J, and those of other countries in Case L.

The Loons are mostly birds of the high North, forming only one genus, and numbering about five species, all of which are found in North America (Case F), as well as in Northern Europe and Asia (Case L). They are large birds, excellent divers, and rather solitary in their habits.

The Auks, rather near allies of the Loons, are also boreal in distribution, being most numerously distributed along the shores of the North Pacific Ocean, to which several of the species are wholly restricted. They are variable in size and appearance, as may be seen by comparing the Auklets (Cases F and L) with the Great Auk and the Puffins. They are rather poor fliers, but expert divers and swimmers, using their wings under water in swimming, so that they may be said to fly in the water as well as in the air. The Great Auk (Fig. 7) is believed to be extinct, no living example having been seen for nearly half a century, and but few specimens exist in museums. A fine skeleton and a mounted skin, however, may be seen in Case F, where the accompanying labels give a brief account of the bird's history.

Order VII, *Longipennes*, includes the Gulls, Terns, and Skimmers. The Jaeger Gulls (family *Stercorariidæ*) are predatory and somewhat Hawk-like in appearance, especially when flying. They pursue their relatives, the Gulls, and rob them of their fish. Of the six known species two are antarctic and four arctic or subarctic in their distribution. (See Cases F and L.)

Fig. 7. Great Auk.

The Gulls and Terns (family *Laridæ*) are numerous in species and are found in all parts of the world. The Terns are particularly graceful in flight, and are hence often termed Sea-Swallows.

Before their recent wholesale slaughter for millinery purposes they were familiar and attractive objects along all our coasts, where now few are to be seen. (See Cases F, J, and L.)

The Skimmers (family *Rhynchopidæ*) are, in general appearance, large Terns with a vertically flattened bill. They even excel the Terns in gracefulness of flight. (See Cases F, J, and L.)

Order VIII, *Tubinares*, consists of three families of wide-ranging, long-winged sea-birds, the Albatrosses (*Diomedeidæ*), the Petrels, Fulmars, and Shearwaters (*Procellariidæ*), and the Diving Petrels (*Pelecanoididæ*). The Albatrosses present the greatest stretch of wing of any known bird, the Wandering Albatross (*Diomedea exulans*) measuring fourteen feet from tip to tip of the outstretched wings. They appear to be always on the wing, and at home in mid-ocean. The group is not numerous in species, and is best represented in the intertropical and south temperate seas. (See Cases F, J, and L.)

Some of the *Procellariidæ*, as the Giant Fulmar, are nearly as large as the smaller Albatrosses ; the greater number are small, the true Petrels (or the Stormy Petrels) ranging from the size of a Thrush to that of a Pigeon. They are all graceful, tireless wanderers over oceanic wastes. Some indication of their variety of form may be seen in Cases F, J, and L. The Diving Petrels form the single genus *Pelecanoides*. They nest in holes or burrows like the true Petrels. (See Case L.)

Order IX, *Steganopodes*, consists of six families of aquatic birds which have the toes fully webbed. (See Cases E, F, J, and L.) They are the Tropic Birds (family *Phaëthontidæ*), of which there are but three species, inhabiting the intertropical seas, and remarkable for the great length of their two middle tail feathers ; the Gannets (family *Sulidæ*), about six species—large, heavy, fish-eating sea-birds, gregarious in habits, and found in nearly all parts of the world ; the Snake-birds (*Anhingidæ*), three or four species, inhabiting the coasts and rivers of warm countries, remarkable for their long, slender, snake-like neck and bill ; the Cormorants (family *Phalacrocoracidæ*), about thirty species, found about the sea-coasts and inland waters of all parts of the world,

varying greatly in size, and often of rather brilliant plumage; the Pelicans (family *Pelecanidæ*), of few species of very large size, widely distributed, and remarkable for the large pouch under the bill, in which they transport fish; the Frigate Birds or Man-o'-War Birds (family *Fregatidæ*), two semitropical species, remarkable for their graceful form, unequalled powers of flight, and the iridescent tints of plumage in the adult males.

Order X, *Chenomorphæ*, includes the Horned Screamers (family *Anhimidæ* = *Palamedeidæ*), the numerous family of Ducks, Geese, and their allies (*Anatidæ*), and the Flamingoes (family *Phœnicopteridæ*). Each of these groups, however, differs so much from either of the others, and from all other birds, that it is sometimes still made a distinct order; they certainly widely differ in both habits and external appearance, as they do likewise in anatomical structure. The Horned Screamers (see Case J) are restricted to tropical America, and number only three species referable to two genera. They are large birds, living in colonies in swamps and brackish lagoons; they are formidably armed with horny spines on the wings, while one species has a long spiny horn on the head. They swim well, and also delight in soaring high in the air. Their screaming call-notes may be heard miles away.

The Duck tribe includes not only the numerous kinds of sea and river Ducks and Teals, but also the Geese and Swans, the family forming several well-marked subfamilies. The species number nearly two hundred, and the family has numerous representatives in all parts of the world. (See Cases E, J, L, and M.)

The Flamingoes (sometimes ranked as an order, *Odontoglossæ*) have a somewhat Duck-like beak, and the long neck and legs of the Storks and Herons, with each of which groups they have at different times been associated. They are essentially long-legged Ducks. They are confined to the tropical and semitropical parts of the world, and altogether number about seven species, one of which extends its range northward in our own country to Florida. (See Cases E, J, and M.)

Order XI, *Herodiones*, includes the four families of Spoonbills (*Plataleidæ*), Ibises (*Ibididæ*), Storks (*Ciconiidæ*), and the Herons

(*Ardeidæ*), and their allies. All are long-legged, long-necked wading birds.

The Spoonbills, remarkable for their flat, spoon-shaped bills and white or rose-colored plumage, are tropical or semitropical in distribution, one of the five or six species reaching the southern border of the United States (see specimens in Cases E, I, and M). The Ibises are more numerous, of similar distribution, and noteworthy for their pure white, scarlet, or iridescent plumage. Especially interesting are the Sacred Ibis (Case M), from its mythological history, and the Scarlet and Glossy Ibises (Cases E and I), from their brilliant plumage. Several of the species occur in different portions of our Southern States. The Storks are also birds of warm countries ; two of the species, however, reach our southern border, the so-called Wood Ibis and the Jabiru (see Case E). The Storks are birds of large size and tall stature, the Adjutant or Maribou Stork (Case M), standing five or six feet in height. Many of them have the head naked and scaly, while the Adjutant is rendered still more ugly by its pouch. Its lower tail-coverts, however, furnish the much-prized maribou feathers, used in millinery.

The Herons include the Egrets and Bitterns, which are only special names for particular kinds of Herons. They are a numerous group, distributed throughout all the warmer parts of the world; about seventy-five species are currently recognized. Many of them, especially the Egrets, are beautifully ornamented with crests and plumes, the traffic in which for millinery purposes bids fair to nearly or quite exterminate some of the species. (Cases E, I, and N.) The Boatbills (genus *Cochlearius*) of tropical America are remarkable for their broad depressed bill.

Two peculiar African birds, the Umbrette (*Scopus umbretta*) (see Case N) and the Shoe-bill (*Balæniceps rex*) are sometimes associated with the Herons and Storks, each being the type of a distinct family, and presenting peculiar features of structure.

Order XII, *Paludicolæ*, or *Alectorides*, is a rather mixed group, embracing quite dissimilar forms. It includes the Trumpeters, Cranes, Courlans, and Rails, which name, in a general sense, covers also the Wood-hens, Moor-hens, Gallinules, Porphyrios, and Coots.

With them are associated the Sun-Bitterns, the Kagu, and the genus *Mesites*, the latter a strange and rare bird inhabiting Madagascar.

The Cranes (family *Gruidæ*) are birds of large size, not numerous in species, and mainly confined to the Old World. Some are beautifully crested, as the African Demoiselle and Crowned Cranes (see Case N), but in general they are plainly colored and have the front of the head naked. (For the American species see Case E.) The Trumpeters (family *Psophiidæ*) are South American (see Case I), and derive their name from the curious loud ventriloquial sounds they emit; they combine characters allying them not only with the Cranes and Rails, but suggesting the Pheasants.

The Courlans (family *Aramidæ*) number only two species, confined to tropical and subtropical America. The Florida species (Case D) has the local name Crying-bird, from its strange wailing notes. The Rails (family *Rallidæ*) are a numerous and widely-distributed group, peculiar in structure and habits, having small weak wings and thin bodies. Some of the forms of this family are almost flightless, as the so-called Wood-hens (genus *Ocydromus*) of New Zealand, and certain extinct species of the Mascarene Islands. One of these, the Géant (*Legautia gigantea*) was of gigantic stature, standing about six feet in height. (See Fig. 8.) It was an inhabitant of Rodriguez, and became extinct about the end of the seventeenth century. The true Rails are mostly of small size and sombre colors; the Gallinules and Porphyrios are larger, and many of them are brightly colored; the Coots resemble them in size and form, but are dull-plumaged and have lobated toes. (See Cases D, I, and N.)

The Sun-Bitterns (family *Eurypygidæ*) resemble both Rails and Herons, though strongly different from either, and having really no near allies. The only two species known are birds of peculiar and striking coloration, inhabiting South America. (See Case I.) The Kagu (family *Rhinochetidæ*)—a strange bird, differing so much from all others as to form a family by itself—is confined to the single small island of New Caledonia. The Sun-Grebes (family *Heliornithidæ*) constitute a small group of three species—one South American, the others African and Asiatic—which sin-

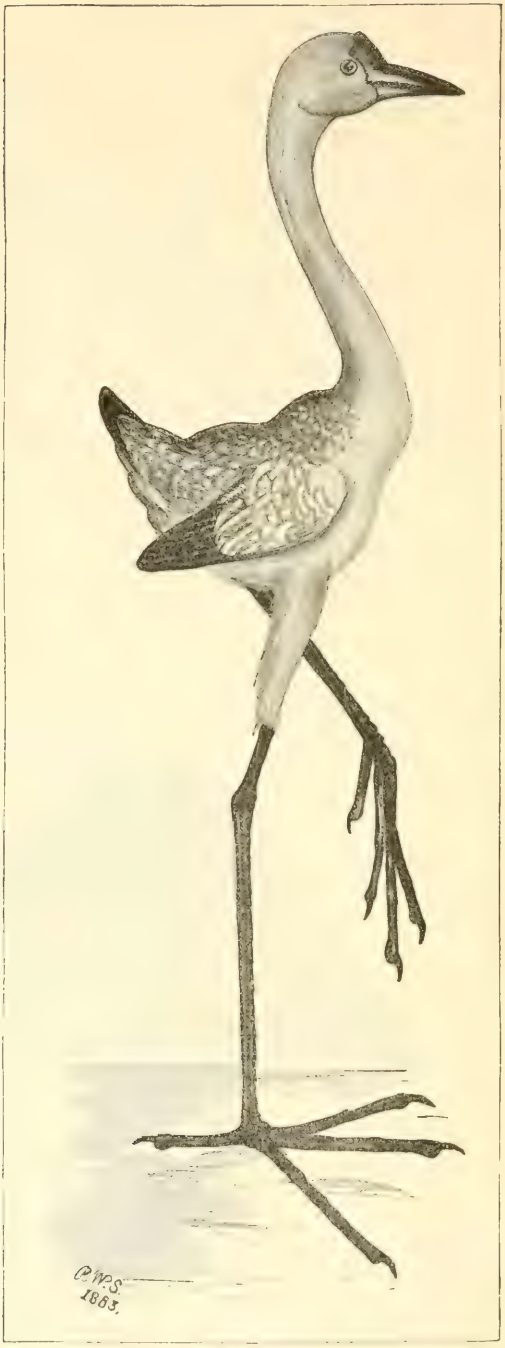

Fig. 5. Géant

gularly combine features of such diverse types as Rails and Grebes. (See Cases I and N.)

Order XIII, *Limicolæ*, is, numerically, a very large group, numbering twelve families and several hundred species. It consists largely of shore and marsh birds, and includes the Sheath-bills (*Chionidida*), Quail-Plovers (*Thinocoridæ*), Pratincoles (*Glareolidæ*), Oyster-catchers (*Hæmatopodidæ*), Surf-birds and Turnstones (*Aphrizidæ*), Plovers and Lapwings (*Charadriidæ*), Jaçanas (*Jacanidæ*), the Snipes, Woodcocks, Curlews, Sandpipers, etc. (*Scolopacidæ*), Stilts and Avocets (*Recurvirostridæ*), Phalaropes (*Phalaropodidæ*), Thick-knees (*Œdicnemidæ*), and Bustards (*Otididæ*).

The Sheath-bills are a somewhat isolated group, consisting of two species, inhabiting chiefly the Kerguelen and Crozets Islands, off the southern extremity of South America. Their nearest affinities are considered to be with the Plovers, although they also somewhat resemble the Gulls. Their plumage is pure white. The Quail-Plovers consist of half-a-dozen species, forming the genera *Thinocorus* and *Attagis*, inhabiting southern South America. As their name implies, they are Plover-like birds with certain resemblances to the Quails. (See Case N.) The Oyster-catchers, Surf-birds, and Turnstones (Cases D, I, and N) are each small groups, so closely related to the Plovers as to be sometimes combined with them in the same family. They are all strictly shore birds of wide distribution. The common Turnstone is one of the few birds occurring in all parts of the world. The Plovers (including the Lapwings and Spur-winged Plovers) are found commonly about the shores of inland rivers and lakes as well as of the sea, some of them, however, inhabiting dry plains. They are mostly plainly colored, but some display metallic tints. They are generally birds of wide distribution. (See Cases E, I, and N.)

The Jaçanas are tropical birds, occurring in both hemispheres. They are remarkable for their long toes, and some of the species have large naked wattles about the base of the bill. The Snipes, Curlews, and Sandpipers constitute the most numerous family of the order ; they are found all over the world, and usually affect sea-shores and river-banks or moist swampy ground, a few only prefering drier or even woody situations. They vary in size from

the Least Sandpiper, not larger than a Sparrow, to the Curlews and Godwits, standing a foot to a foot and a half in height, with bills six to eight inches in length (see Cases D, I, and N). Most of the species breed in arctic and subarctic regions.

The Stilts and Avocets are noteworthy for their long legs, long, slender, and sometimes upward curved bills, and black and white colors. They number but few species, and are mainly restricted to warm temperate and tropical or subtropical countries. The Palaropes form a group of three species, all represented in North America ; they are graceful swimmers, and being found often far out at sea, swimming in flocks, have been fantastically called "Sea Geese," although scarcely larger than the smaller Sandpipers, which in general form they much resemble (see Case D). The Thick-knees, or Stone-Plovers, are more Plover-like in form, are subtropical in distribution, and number only a few species. The Bustards are strictly Old World and semitropical in distribution ; the greater part of the thirty-five species occur in Africa, and range in size from birds the size of a Grouse to that of a Turkey. They present many interesting characters, and resemble Grouse quite as much as Plovers. (See Cases N and O.)

Order XIV, *Opisthocomi*, consists of a single species, inhabiting South America, known as the Hoatzin (*Opisthocomus cristatus*), whose conflicting relationships have long been a puzzle to naturalists. Examination of its anatomy, however, has so settled its affinities that it now stands as an order near the gallinaceous birds—"sole relict of an ancestral type." (See Case I.)

Order XV, *Gallinæ* (Fowls or Gallinaceous Birds), includes four families and some three hundred and fifty species. Among them are not only our domestic fowls (Turkeys, Pea-fowls, Guinea-fowls, and other "poultry"), but the Pheasants, Quails, Partridges, Grouse, Megapodes, Curassows, and Guans. These groups are divisible into two well-marked suborders, the first consisting of the Pheasants, Fowls, Grouse, and their allies (*Gallinæ alectoropodes*, or Fowl-footed *Gallinæ*), and the other of the Megapodes, Curassows, and Guans (*Gallinæ peristeropodes*, or Pigeon-footed *Gallinæ*).

The Quails, Partridges, and Grouse (family *Tetraonidæ*) form three subfamilies; the first, *Perdicinæ*, consists of the true Quails and Partridges, and is confined to the Old World, where it is

Fig. 9. California Partridge.

numerously represented (about one hundred species), and embraces many genera; it includes the Crested Wood-Quails or Roulrouls, the Francolins, and the so-called Snow Pheasants, etc., as well as the ordinary Quails and Partridges. (See Case O.) The

subfamily *Odontophorinæ* (about sixty species) is strictly American, and includes our Bob-whites and other commonly so-called Quails and Partridges; the group is numerously represented in tropical as well as in temperate America. (See Cases D and I.) The subfamily *Tetraoninæ* (about twenty-five species) includes the Ptarmigans and Grouse, and is confined to the temperate and arctic portions of both hemispheres. They differ from all the foregoing in having the legs generally heavily feathered to the toes.

Fig. 10. A Prairie Minuet.

The Capercaillie and the Sage Grouse are the largest and most noteworthy forms of the group. (See Cases D and O.) Our Prairie-Hen is a familiar and interesting example of the group, remarkable for its fantastic nuptial dances, as represented in Fig. 10.

The Ruffed Grouse (Fig. 11) of the northeastern United States and Canada is perhaps better known under the names of Partridge (in New England) and Pheasant (in Virginia and adjoining States).

The family *Phasianidæ* is especially noteworthy as containing the birds most useful to man, as well as many remarkable for the beauty of their plumage. Its eighty or ninety species are all Old World except two (the Turkeys), and include the Guinea-fowls (about ten species, confined to Africa and Madagascar), the Jungle-fowls (four or five species, found in India and neighboring islands), the true Pheasants (about forty species, nearly all con-

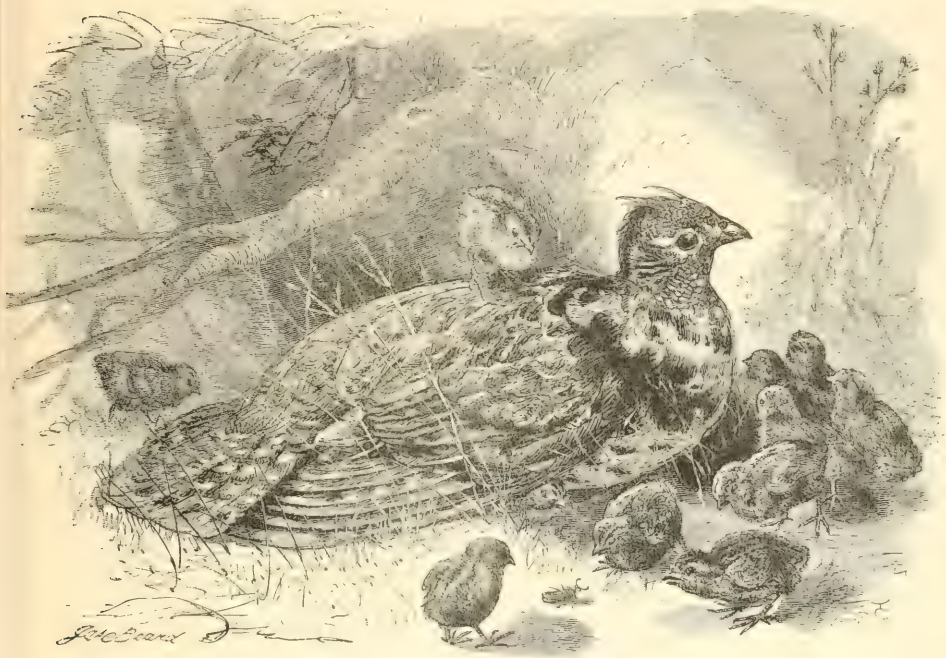

Fig. 11. Ruffed Grouse and Young.

fined to Asia), the Turkeys (American, two species), the Tragopans, Eared-pheasants, Argus Pheasants, and the Peacock Pheasants (all Asiatic, and numbering about thirty species). The many striking forms, as the Jungle-fowls (ancestors of the domestic fowls), the Tragopan, Impeyan, Reeves's, Elliot's, Lady Amherst, Argus, Peacock, and other Pheasants—too numerous to mention at length—may be seen in Cases O and P, and the Turkeys in Cases D and I.

The Megapodes and Mound-builders (family *Megapodiidæ*) are remarkable for their "extraordinary method of nidification," they being "the first feathered inventors of an artificial incubator to take the place of the mother" in providing the warmth necessary for hatching the eggs. They build mounds of earth and dead leaves or other vegetable matter, in which they lay their eggs to be hatched by the heat developed by the decomposition of the

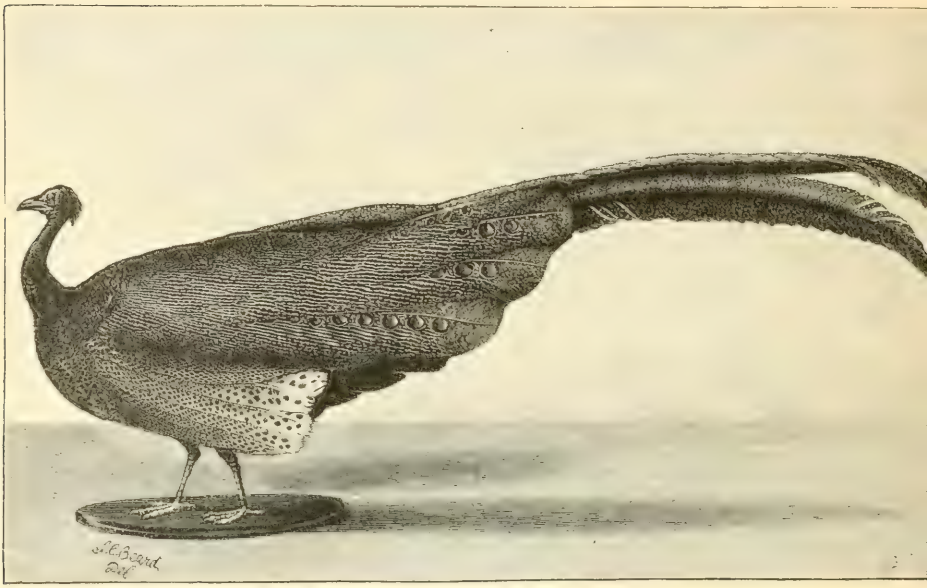

Fig. 12. Argus Pheasant.

mass. These mounds are sometimes of enormous size, being added to year after year by the original builders or their descendants. The Megapodes (or Big-feet) numbering nearly thirty species, and the Mound-builders about six, and are confined to Australia, New Guinea and neighboring islands. (See Case P.)

The Curassows and Guans (family *Cracidæ*) are exclusively inhabitants of tropical and subtropical America, one species (see Case C) reaching the Texan border of the United States. They number altogether about sixty species, varying in size from that

of a large Cuckoo to that of a Turkey. They are arboreal and nest in trees. Some are curiously crested and helmeted (see Case I).

Order XVI, *Pterocletes*, is a small group, embracing the Sand-Grouse, which curiously combine some of the characteristics of Pigeons with others strongly suggestive of the Grouse and Plovers. They number about twenty species, all Old World (see Case P). They constitute the two genera *Pterocles* and *Syrrhaptes*.

Order XVII, *Columbæ*, the Pigeons, includes several families, only one of which occurs in America. The first, *Dididæ*, is represented by only two species, both of which are extinct—the famous Dodo (*Didus ineptus*), and the Solitaire (*Pezophaps solitaria*). Both were large ungainly birds, with wings too small for flight. Their affinities were for a long time in doubt, but naturalists now agree in giving them a place in the order of Pigeons. They formerly inhabited the islands of Rodriguez and Mauritius, the Dodo being also found in the Isle of Bourbon. The Dutch navigators found them numerous when they first visited these islands early in the seventeenth century, but they were exterminated about the end of that century. They are known only from two or three paintings and from their bones, discovered principally in the swamps of Mauritius. A part of a skeleton may be seen in Case T of the Geological Hall.

The family *Didunculidæ* is also a small group, consisting of a single species, the Tooth-billed Pigeon (*Didunculus strigirostris*), inhabiting the Samoan Islands. (Case P.)

The Crowned Pigeons (family *Gouridæ*) are ground Pigeons; they are birds of large size, with high open crests, and striking appearance (see Case P). Only about six species are known, confined to New Guinea and some of the neighboring Papuan Islands.

The true Pigeons and Doves (family *Columbidæ*) are represented in all countries, though most numerous in the subtropical and tropical regions. Nearly three hundred species are recognized, of which about ninety are American, but only about a dozen are found in the United States (see Case C). They vary

greatly in size and form, though none are very large, and some are beautifully colored.

The Fruit Pigeons (family *Carpophagidæ*) are especially remarkable for their brilliant tints and striking contrasts of color. (See Case P.) They number about two hundred species, and are chiefly confined to Southeastern Asia, Australia, Madagascar, the Indian Archipelago, and the Pacific Islands.

Order XIX, the *Accipitres*, or Birds of Prey, form a numerous assemblage, represented everywhere, and include, if we admit certain species here whose affinities are still questionable, quite diverse forms. The order may be divided into five families, each of which is also considered to have the value of a suborder. The first of these (*Cariamidæ*) consists of two species, found only in South America, the Chunga and the Seriama. (See Case H.) These birds curiously combine raptorial characters with certain features of the Rails and Cranes, with or near which they are often associated in systems of classification. Notwithstanding their Crane-like form, late authorities grant them a place with the true Birds of Prey. The strange Secretary Bird of South Africa (forming the family *Gypogeranidæ*) is in similar case, though more generally considered a near ally of the Hawks and Vultures. (See Case P.)

The American Vultures (family *Cathartidæ*) have so little in common with the Vultures of the Old World that of late years they have been separated from them as a distinct family. They form a highly useful group of scavengers, numbering about eight species, confined mainly to the tropical portions of America. Among them are three of the largest Birds of Prey, the Condor and King Vulture of South America (see Case I), and the California Vulture (see Case C), each having an expanse of wing of about twelve feet.

The family *Falconidæ* includes all of the remaining Diurnal Birds of Prey (more than three hundred and fifty species), embracing the true or Old World Vultures, the Eagles and Buzzards, the Ospreys, the Harriers, the Kites, the Carrion-Buzzards, the true Hawks, and the Falcons, each group, as here named, constituting a separate subfamily. Of the true Vultures (*Vulturinæ*

—Case P), numbering about twelve species, noteworthy forms are the Griffon, Egyptian, Nubian, Pondicherry, and Bengal Vultures—the largest of the Old World Birds of Prey. They inhabit Africa, India, and Southern Europe. The Vultures grade almost insensibly into the Eagles, through the so-called Eagle-Vultures of Africa and the noted Bearded Vulture or Lammergeyer of Central Europe and Northern India. The true Eagles (*Aquilinæ*) again merge gradually into the Buzzards, which are in structure and habits only lesser Eagles. The typical Eagles are represented in North America (see Case C) by the Golden and Bald or White-headed Eagles, the so-called "Bird of Washington" or Washington Eagle proving to be merely a young Bald Eagle. Noteworthy forms among the Old World Eagles (Cases P and Q) are the Imperial Eagle, the African Sea-Eagle, and the Kamtschatkan Sea-Eagle, a fine example of which latter may be seen in the collection. The celebrated Harpy Eagle, and the Guianan Eagle are among the most imposing of the Eagles of tropical America (Case I). The Buzzards, numerous in all parts of the world, are well exemplified by our common "Hen-Hawks" (genus *Buteo*—see Case C). The Eagle-Buzzard group includes about one hundred and twenty species. The Fishhawk or Osprey, almost cosmopolitan in distribution, is the sole representative of the subfamily *Pandioninæ* (see Case C). The Harriers (subfamily *Circinæ*) consists of about twenty species, represented everywhere, of which our Marsh Hawk is a fair example (see Case C). The Kites (subfamily *Milvinæ*—about thirty species) are long-winged, slender, graceful birds, of which the most beautiful (though not the most typical) is the Swallow-tailed Kite of the warmer parts of America (Case C). South American and Old World forms may be seen in Cases I and Q. The Carrion-Buzzards (subfamily *Polyborinæ*—eight or ten species) are restricted to tropical and subtropical America (see Case I); in habits they somewhat resemble the New World Vultures. The so-called Caracara Eagle (Case C) is a typical representative of the group. The true Hawks (subfamily *Accipitrinæ*—about seventy species) are short-winged, impetuous birds, and include the "Chicken-Hawks," Goshawks, Sparrow-Hawks, and their allies. They are numerous in species, having representatives everywhere (see Cases C, I, and Q). The

true Falcons (*Falconinæ*—about seventy species) include the Kestrils, Merlins, Peregrines, Gyrfalcons, and their numerous allies, the group being cosmopolitan. They are among the boldest and most dashing of the Birds of Prey. (See Cases C, I, and Q.)

The Owls (family *Strigidæ*), or Nocturnal Birds of Prey, differ so much from the other raptorial birds as to be sometimes

Fig. 13. An Owl Family.

treated as a distinct order (*Striges*). They number nearly two hundred species, and as a group are cosmopolitan in distribution. The extremes of the group, as regards external appearance and habits, are seen in the Barn Owl—the most nocturnal and Owlish of the Owls—and the Hawk Owl, the most diurnal and Hawk-like. (Examples of each may be seen in Case C.) Owls vary in

size from the Snowy Owls and Eagle-Owls of the high North, and the Great Horned Owls, nearly two feet in length, of our own country, to the little Pygmy and Elf Owls—scarcely larger than a large Sparrow—of Arizona and tropical America. (See Cases C, I, and Q. The common Screech Owl is shown in Group No. 37.)

Order XX, the *Psittaci*, or the great Parrot group, is mainly tropical in distribution, having numerous representatives in all the tropical and semitropical regions of the world. They are mostly birds of gaudy plumage, with striking contrasts of color. They vary in size from the little Love-birds, not larger than a Sparrow, to the great Macaws, more than three feet in length. They are usually gregarious, often roaming in large flocks. While their voices are naturally harsh and discordant, many of the species display great imitative powers, readily learn to talk, and often manifest great intelligence. About four hundred and fifty species are recognized, which different authorities arrange in from three to nine families. They perhaps fall most naturally into about four, based wholly on anatomical characters.

The Owl Parrots (family *Stringopidæ*), of New Zealand (Case R), are partly nocturnal in habits, and somewhat Owl-like in appearance. Only two species are known, and one of these is believed to be nearly extinct. They rarely fly, and through disuse of the muscles of flight the keel of the sternum has become obsolete. The Owl or Night Parrots thus depart widely from the other members of the order.

The Cockatoos (family *Cacatuidæ*) form also a well-marked group, numbering about thirty species, confined to the Indian Archipelago, the Papuan Islands, and Australia. They are mostly of large size, with large open crests, which are usually flame-colored, or of some shade of yellow or red, while the general plumage is often white (see Case R). Some of the species, however, are brown, and one of the largest of all is black.

The family *Palæornithidæ* is a large group of strictly Old World Parrots and Parrakeets, which includes the groups called Lories, Lorikeets, Grass-Parrakeets, and Love-birds. They range from Africa and Madagascar through India, the Indian Archipelago, and the Papuan Islands to Australia and New Zealand. They

vary much in size, but for the most part are long-tailed and strikingly colored.

The family *Psittacidæ* embraces the remaining species of the order, including all the species of the New World, as well as a large number from Africa and Australia. The members of this numerous group present wide differences of form, they including not only the short, square-tailed Gray Parrots of Africa and the Amazons of America, but the long-tailed Macaws and numerous Parrakeets, while as regards size they embrace both the largest and the smallest representatives of the order. They are in general much less vividly colored than the members of the preceding family, green tints, varied with markings of red, yellow, blue, or white, prevailing. The Carolina Parrakeet (Case B) is the only one of the numerous American species reaching the United States. Although formerly more or less common from the Ohio and Potomac Rivers southward it is now nearly extinct, being restricted to a few localities, chiefly in Florida. The New World Parrots are in Case H; the Old World Parrots in Case R.

Order XXI, *Picariæ*, embraces an immense number of species (estimated at about 1600), usually arranged in five or six suborders and in about twenty-three families. They possess very few characters strictly in common, but certain mutual resemblances which are thought to ally them more closely together than with any other ordinal group. Several of the suborders, as the Woodpeckers, for example, have been sometimes awarded the rank of orders. The families of the *Picariæ* may be briefly enumerated as follows: The Plantain-eaters (*Musophagidæ*) are a small group of African birds, somewhat gallinaceous in aspect, with peculiar and rather striking colors (see Case Q). The Cuckoos (*Cuculidæ*) are widely distributed, very numerous in species, and variable in appearance. Some are arboreal, as the ordinary Cuckoos of Europe and North America, while others are terrestrial, like the Road-runner of our Southwestern United States (Case B) and the Ground-Cuckoos of the West Indies and South America (Case H). In general the colors are soft and blending, but the South African Golden Cuckoos (Case Q) are richly iridescent. Some of the Australian species are as large as a Crow, many others, found in

various tropical countries, are not larger than small Thrushes.

One of the most peculiar birds of the Picarian order is the Guacharo or Oil-bird of Northern South America, sometimes regarded as so different from other birds as to be placed as a distinct order. It is allied on the one hand to the Owls, and on the other to the Goatsuckers, and has sometimes been looked upon as merely a gigantic Goatsucker. The single known species forms the family *Steatornithidæ* (Case H).

The Goatsuckers (*Caprimulgidæ*) are widely distributed, having representatives everywhere. The group includes our Nighthawks and Whippoorwills, and also several remarkable forms inhabiting the tropics, as the Lyre-tailed Goatsuckers of South America (Case H), and the Pennant-winged Nightjar of Africa. They are nearly all nocturnal in habits, with soft mixed colors of gray, buff, brown, black, and white, and singularly distinct notes, from which many of the species, as our Whippoorwills and Chuckwills-widow, have derived their vernacular names, which are imitative of their notes. The Moreporks and Frogmouths (*Podargidæ*) of Australia, New Guinea, and the East Indies (Case Q) are near allies of the Goatsuckers and Nightjars.

The Rollers (*Coraciidæ*) externally somewhat resemble Jays, especially in the coloration of some of the species, but many anatomical features indicate that their nearest affinities are with the Picarian series. They range throughout the greater part of the Old World, to which they are restricted (see Case R).

The Kirumbo, of Madagascar, distinctly allied to the Rollers, constitutes the single species of the family *Leptosomidæ* (Case R).

The Colies (*Coliidæ*), a small group restricted to tropical Africa and Madagascar, find a place here, though so distinct from their allies as to be assigned the rank of a suborder. They are fruit eaters, of plain colors, bold and active, and quaint in their attitudes (Case R).

The Bee-eaters (*Meropidæ*) are exclusively birds of the Old World, mainly tropical, and richly colored. They nest in colonies, in river banks, which they are said to tunnel for a distance of eight to ten feet, at the end of which the nest is placed. As their name indicates, their food is chiefly bees, wasps, and other insects, which they capture on the wing. (See Case S.)

The Motmots form an allied family (*Momotidæ*), found only in tropical America. Most of the species have serrated bills, long tails, and rather subdued but peculiar colors. Some of the species have the long middle feathers of the tail racket-shaped, a feature said to be produced by the birds themselves by biting off a portion of the barbs. (See Case H.) Nearly allied to these are the Todies (*Todidæ*), consisting of about half-a-dozen species confined to the West Indian Islands. They are small birds, mostly green in color, with the throat of some shade of red (Case H). They nest, like the Kingfishers, Motmots, and Colies, in holes in banks, and lay white eggs.

The Kingfishers (*Alcedinidæ*) are a cosmopolitan group, numbering about one hundred and thirty species. Most of them are richly colored, and generally more or less crested ; some are very small, as the Wood-Kingfishers of Africa ; others are as large as Crows, as the Giant Kingfishers or Laughing Jackasses of Australia (Case R). Among the most interesting in form and most striking in coloration are the Racket-tailed Kingfishers of New Guinea. The food varies with the different groups, some being more or less omnivorous, others feeding on reptiles, others on shrimps and small crabs, and others exclusively on fishes, as is the case with our North American species (Case B), and also those of South America (Case H).

The Hornbills (*Bucerotidæ*) are believed to be near relatives of the Kingfishers, notwithstanding their enormously modified beaks. The sixty known species are all Old World birds, where their distribution is mainly tropical. They are large, heavy, and of strange appearance (Case R), but their breeding habits are still more novel. They nest in hollow trees, and the male bird confines the female as a prisoner during the period of incubation by closing the entrance to the nest with clay, except a small aperture, through which he feeds her.

The Hoopoes (*Upupidæ*), and the Wood-Hoopoes (*Irrisoridæ*) —the former numbering six species, the latter ten—form two families constituting the suborder *Upupoidæ*. The Hoopoes are remarkable for their large crests, of which the Common Hoopoe of Europe (Case S) is a good example. The Wood-Hoopoes are African and have the climbing habits of Woodpeckers.

The Puff-birds (*Bucconidæ*) form a numerous group (about fifty species) of small birds, with stout bills, loose, puffy plumage and striking colors, confined to tropical America (Case H). The Jacamars (*Galbulidæ*), also tropical American, have slender bills and iridescent plumage, usually of some shade of green above. They somewhat resemble Kingfishers in habits and general form (Case H).

The Toucans (*Rhamphastidæ*) are among the most striking of birds, being arrayed in rather brilliant and strongly contrasting colors, with a beak, in some of the species, nearly as large as the body (Case H). The bill, though so large, is extremely light, being hollow and the walls very thin. They are sluggish birds, with small weak wings ; they subsist upon fruits and nest in hollow trees. They are exclusively restricted to the American tropics, and have no near relatives.

The Barbets (*Megalaimidæ*) are mainly confined to the tropical forests of the Old World, where about five-sixths of the eighty species are found, the remainder occurring in the corresponding regions of the New World. They much resemble, externally, the Puff-birds, being somewhat similarly colored, and having much the same clumsy form. They are strikingly arrayed in vividly contrasting colors (Cases H and S).

The Honey-Guides (*Indicatoridæ*) form a small Old World family of about a dozen species, confined to the tropics, and mainly to Africa. They are small birds, of rather dull colors (Case S), and derive their name from their authenticated habit of guiding the natives of South Africa to trees containing the nests of bees, to share with their human allies the store of honey the bees have collected.

So different are the Woodpeckers, at least in general appearance and habits, from the other Picarian birds, it seems strange to find them so associated, yet most late authorities agree that their general structure warrants this arrangement rather than their recognition as an ordinal group. They form, however, a well-marked suborder, consisting of one family (*Picidæ*), divisible into three subfamilies. The first of these is that of the Piculets (*Picumninæ*)—small Woodpecker-like birds, with soft tails and sombre colors, having about twenty representatives in tropical

America (Case H), five in India, and one in Africa (Case S). They are the pygmies of the family. The true Woodpeckers (subfamily *Picinæ*) may be recognized by their stiffened tails, which they use as a prop in climbing. They are found in all wooded countries, except Madagascar, and Australia and its neighboring islands. They number about three hundred and thirty species, and vary greatly in size and style of coloration. They present many striking forms, as seen in Cases, B, H, and S.

The Wrynecks (subfamily *Jynginæ*) are a small group of Old World birds, of only about half-a-dozen species, closely allied to the Woodpeckers in general structure and habits, but having a soft instead of a stiff tail. The common Wryneck of Europe (Case S) well illustrates the group.

The Trogons (*Trogonidæ*) form a well-marked family of about fifty species, inhabiting the tropical regions of both the Old World and the New, the greater number, however, being found in the American tropics. They are structurally quite different from any other group of the Picariæ. They are all birds of gorgeous coloring, but the most striking of all is the Paradise Trogon or Quetzal of Central America (Case H), which in addition to its brilliant colors is crested and has its wing-coverts and upper tail-coverts enormously lengthened into gracefully drooping brilliant green plumes. (The Old World species are in Case S.)

The Swifts and Hummingbirds form the suborder *Macrochires*, a group considered by some systematists to be entitled to ordinal rank. The Swifts (family *Micropodidæ*, formerly called *Cypselidæ*), numbering about fifty species, are found nearly all over the world, but are most numerous in the tropical regions. The ordinary Swifts, with stiff, spiny tails, are well exemplified by our Chimney Swift (Case B), but the Tree-Swifts of India and the Malay Archipelago (Case S) more resemble Swallows, with which in fact the whole family of Swifts is often popularly confounded, although in reality the two groups are only superficially allied. The Swiftlets of the Polynesian Islands and Madagascar (Case S), which make the "edible bird's-nests" of commerce, are diminutive members of the family, in comparison with the Alpine Swift of Europe. They breed in deep caves, in large colonies, where they attach their gelatinous nests to the walls. These nests are the product of the

birds' salivary glands mixed with algæ. The annual value of the nests gathered from the Gomanton caves in Northern Borneo is said to be about $25,000.

The Hummingbirds (family *Trochilidæ*) are found only in the New World; a few of the species reach the temperate latitudes of both North and South America, some ranging as far north as Canada and Alaska (see Case B). Nearly all of the rather more than four hundred species, however, are confined to the tropical and subtropical regions. Some of the species are very plainly colored, as the Giant Hummer (*Patagona gigas*), of the size of a Swallow and the largest member of the family, but the absence of iridescent tints is the exception, while many display an array of color rivalling the choicest gems. The variety of form in the bill and tail is almost endless, while many of the species are variously ornamented with crests, ruffs, and beards, sparkling with the most luminous tints. Most of the leading styles of these ornithological jewels are represented in Case G.

Order XXII, *Passeres*, comprises all the ordinary Song-birds and so-called Perching-birds, numbering about six thousand species—a number equal to that of all the other orders together. Though so numerous in species, they present no great range of variation in structure, and are thus not divisible into suborders which are by any means very strongly marked. The two to five subdivisions of a subordinal character now most frequently recognized are based on certain muscles of the wings and lower larynx, which are in some cases of doubtful importance. The two suborders most commonly recognized are the Acromyodian Passeres, or *Clamatores*, and the Mesomyodian Passeres, or *Oscines*. A third division, *Pseudoscines*, or *Menuroidæ*, has been proposed for the Lyre-birds and an allied family of Australian birds, which combine certain Picarian features with others of the true Oscines or Song-birds. This group is on the whole to be placed first, or next to the *Picariæ;* and we thus begin the series with the so-called *Pseudoscines* (pseudo-song-birds).

The Lyre-birds (family *Menuridæ*) number only two species, both natives of Australia, and remarkable for their unique lyre-shaped tails. They are musical birds, and are credited with great

proficiency in imitating the voices of other birds and animals. Both species are represented in Case S.

The Brush-birds (*Atrichornithidæ*), though closely allied to the Lyre-birds in structure, habits, and imitative powers, resemble

Fig. 14. Lyre-bird.

them little in external appearance. They number, like the Lyre-birds, only two species, and are likewise restricted to Australia (Case S). Their ventriloquial capabilities are said to be almost incredible.

The second suborder of the Passeres, the *Clamatores* or Screeching-birds, differs from the true Song-birds chiefly in the structure

of the vocal organs. They include a number of well-marked family groups, and are very numerous in species. The Broad-mouths (family *Eurylaimidæ*) have a strong external resemblance to the Barbets, with which they were formerly associated by systematists. They present, however, many features of the true Song-birds. They form a small group of about a dozen species, of rather strikingly-colored small birds, confined to Southeastern Asia (see Case S).

The family *Xenicidæ* comprises but three or four species, found only in New Zealand (Case S), which in habits and external appearance so greatly resemble Wrens and Creepers as to have been until recently associated with them as true Song-birds, their clamatorial character having been only lately determined.

The *Philepittidæ* consists of only two species, inhabiting Madagascar (Case S), which somewhat resemble the Sun-birds, and also the Birds-of-Paradise, their position in the present connection having been only recently established by anatomical examination of their structure.

The true Pittas (*Pittidæ*) are quite Thrush-like in the form of the bill and in some other features, and have been sometimes called Ground Thrushes. They are birds of the Old World tropics, most numerously represented in the large islands of Borneo and Sumatra, where these brilliantly-colored birds (Case S) attain their highest beauty. In the rich contrasts of purples, greens, blues, crimsons, and yellows, they fairly vie with the gorgeous coloring of the Tanagers of the New World. Nearly forty species are currently recognized, distributed from Africa to Australia.

The Tyrant Flycatchers (family *Tyrannidæ*) are all American, and about nine-tenths of the three hundred and fifty species are tropical; the other tenth is North American, of which our Kingbird and Pewees are familiar representatives (Case B, and Groups 34 and 35). They are pugnacious and quarrelsome, well deserving the name "tyrants." They present great diversity of size and form (see Case G); many are crested, and some are brightly colored, but a large proportion of even the tropical forms are clad in the plainest and most inconspicuous browns and olives. The most striking forms are the Scissor-tailed and Fork-tailed

Flycatchers (genus *Milvulus*), which range over a large part of tropical America and extend north to Texas (see Case B), while the most brilliantly colored are the Vermilion Flycatcher (reaching Texas and Arizona), and the Kinglet-like *Cyanotis* (Case G). The bill varies in size and shape from the Finch-like bill of the Beardless Flycatcher (genus *Ornithion*) to the broad, greatly flattened bills of the Flatbills (genera *Platyrhynchus* and *Todirostrum*). Some of the forms ape the Thrushes and Stonechats in coloration and general appearance.

The small family *Conopophagidæ*, consisting of two genera and about fifteen species, strictly South American, somewhat resembles the Tyrant Flycatchers, of which family they were formerly ranked as a subfamily. From the somewhat Pipit-like form of some of the species they have been termed Ant-Pipits. (See Case G.)

The Pipras or Manakins (family *Pipridæ*) are a group of mostly small birds, strictly American, and mainly confined to the tropical portions of South America. The males are generally gorgeously colored, those of many of the species having also filamentous appendages to the tail. The females, on the contrary, are very plainly attired. The group numbers about sixty species (Case G).

The Cotingas (family *Cotingidæ*), likewise tropical American, is a larger and more varied group, containing many interesting forms, including the Cocks-of-the-Rock (genus *Rupicola*), the curious Umbrella-bird, and the celebrated Bell-birds. The species vary much in size, some being as large as a Crow, and curiously ornamented with fleshy caruncles; others are quite small and lack all special ornamentation. Others again, of medium size, are almost unrivalled in their brilliant tints. Most of the leading forms of the family are represented in Case G.

The Plant-cutters (family *Phytotomidæ*) number only three species, confined to South America. They are Finch-like in general aspect, with serrated bills. They are said to be very injurious to plantations by cutting off the buds and tender shoots of cultivated plants.

The Tapacolas (*Pteroptochidæ*) are Wren-like in form, and have the same skulking habits. They number about twenty species, nearly all confined to Chili and Patagonia. (See Case G.)

The Ant-Shrikes, Ant-Wrens, and Ant-Thrushes form the large family *Formicariidæ* (Case G), numbering more than two hundred species. It is strictly American, and has representatives from Southern Mexico to Paraguay, excluding the West Indies. The family falls into three general groups, as above indicated. The Ant-Shrikes, through their general form and strong, hooked bill superficially much resemble the true Shrikes. The Ant-Wrens are smaller, weaker birds, with a slender bill. The Ant-Thrushes have a Thrush-like bill, but a short, square tail and rather long legs, thus in form more resembling the Pittas of the Old World than the true Thrushes. They are all birds of the thickets, of plain simple colors and secretive habits, and rather remarkable ventriloquial powers.

Another numerous and peculiar American group consists of the so-called Woodhewers (family *Dendrocolaptidæ*), which in external form and habits curiously imitate the Tree-Creepers of the genus *Certhia*. The tail is stiffened, to serve as a prop in climbing, just as in the Woodpeckers and Tree-Creepers. The bill is slender, often very long and much curved (see Case G); the plumage is sombre, generally of some neutral shade of brown, the colors thus harmonizing with the tints of the tree-trunks on which they spend most of their lives. The popular name Woodhewers is a misnomer, since the weakness and slenderness of their bills preclude any wood-hewing, in the sense of the chiseling done by Woodpeckers.

The family *Furnariidæ* has many characters in common with the last, of which it is frequently treated as a subfamily, although differing in the form of the palatal bones. It is a very numerous group (embracing nearly two hundred species), presenting widely diverse forms, some of the species having stiffened tails and Creeper-like habits; others have lengthened tails, with the quills slightly stiffened at the point, and more the habits of Wrens. Others still are Lark-like, both in form and habits. Many of the species are remarkable for their nest-structures, which are often of immense size for the small size of the birds, and heavily armed with spiny twigs; others, as the so-called Oven-birds, build a large chambered nest of clay, placed on the limbs of trees; still others nest in burrows. The species are remarkably plain in coloration, none of them displaying any bright tints.

The suborder *Oscines* is the most numerous and most homogeneous subordinal division among the Passerine birds, and no very sharp lines of division into even family groups have been discovered. Consequently the number of families, their sequence and the respective limits assigned to each varies greatly in even the most recent systems of classification. Many authors throw them into half-a-dozen primary groups, in accordance with the shape of the bill, though the arrangement is admittedly artificial. Thus we have, for example the toothed-billed series or *Dentirostres*, the broad-billed or *Latirostres*, the cone-billed or *Conirostres*, the slender-billed or *Tenuirostres*, etc. These groups are divided into numerous families, those best entitled to recognition as such being the following.

The Larks (*Alaudidæ*) are mostly small ground birds of stately carriage, of plain colors, mostly streaked, and with a long claw to the hind toe. They are largely birds of the plains and deserts, numbering rather more than a hundred species (see Case S), most numerously represented in Europe, Asia, and Africa. One species, running into many geographical races, is found widely dispersed in North America (Case B).

The Wagtails and Pipits (*Motacillidæ*) are birds of similar habits and distribution, the latter also much resembling the Larks in coloration. The Wagtails, however, have longer tails and a very different style of coloration, being marked with large areas of white and black, or with yellow and gray, as seen in the Pied and Yellow Wagtails of Europe (Case S). About seventy species are recognized.

The Crows and Jays (*Corvidæ*) are represented in all parts of the world except New Zealand, but only sparingly so, and by rather peculiar types in Australia. The Crows proper include the Ravens as well as the ordinary Crows ; with few exceptions they are black in all stages of plumage. (For the North American species see Case B ; the Old World Crows may be seen in Case S.) The Jays, on the other hand, are gaudily arrayed in various shades of blue, green, and yellow, variously combined with white ; a few only are clad in plain grays and browns. Many of the species are beautifully crested, and not a few have also greatly lengthened tails (see Cases B, G, and S). They are noisy,

vivacious, shrewd, and impudent, but very amusing and interesting, and are in their manners quite unlike the sedate, dignified, and highly sagacious Crows and Ravens. The most striking of the Jays inhabit tropical Asia and tropical America. The family

Fig. 15. Bower Bird (*Chlamydodera nuchalis*) and play-house.

also includes the Nut-crackers and Choughs, and numbers altogether nearly two hundred species.

Quite nearly related to the Crows and Jays, though so different from them in external appearance, are the gorgeous Birds-of-Paradise (*Paradiseidæ*), of Australia and New Guinea, and the neighboring Papuan Islands. The forty or more species fall into

several well-marked groups. The first includes the true Birds-of-Paradise, remarkable for their abundant long plumes, which, with their striking colors, render them perhaps the most beautiful of all birds. These plumes grow mostly from the sides of the breast, and are sometimes fully two feet in length. Sometimes they take the form of broad fan-shaped tufts, with additional ornamental plumes on the head or tipping the tail-feathers. Among the most remarkable are the Red Bird-of-Paradise, the King Bird-of-Paradise, the Twelve-wired Bird-of-Paradise, etc. (Case S). The Manucodes, while less gaudily arrayed, are remarkable for the velvety texture of their plumage. The long-billed Birds-of-Paradise include likewise many striking forms, being adorned with large breast-shields and silky flank-plumes, as the Rifle-birds, or very long and brilliantly-colored tails, as the Elliot and Magnificent Birds-of-Paradise. The Bower Birds of Australia and New Guinea, remarkable for constructing arbor-like play-grounds, most elaborately woven and ornamented (see Fig. 15), are also now associated with the Paradise Birds.

The great Starling family (*Sturnidæ*) includes the true Starlings, the Glossy Starlings of Africa, and the numerous species of Pastors and Mynas of India. While some of the Pastors and Mynas are plainly colored, the true Starlings and the Glossy Starlings are clad in brilliantly iridescent plumage. They are mostly gregarious birds, numbering about two hundred species, and all are confined to the Old World.

The American Orioles, Blackbirds, and Troupials (family *Icteridæ*) may be considered as the New World representatives of the Old World Starlings and Mynas, though not in reality very closely related to them. They number not less than one hundred and fifty species, and are represented in the United States by such familiar forms as our Baltimore and Orchard Orioles (see Groups 32 and 33), the Bobolink, Cow-bird, the Blackbirds and Grackles (see Case B). The group finds its metropolis, however, in tropical America, where more than nine-tenths of the species are found, including most of the Orioles (some fifty in number), and the numerous tribe of Cassicans, none of which latter are found north of Southern Mexico and Central America (see Case G.)

The largest family of the Song-birds is that of the great group

of Finches, Crossbills, Snow-flakes, Buntings, and Sparrows (*Fringillidæ*), numbering over five hundred and fifty species, with representatives in all parts of the world, except the Australian region. They are for the most part plainly colored, with very rarely any special ornamentation, but varying greatly in the size and form of the beak. The Crossbills have the mandibles curved and crossed at the point; the Grosbeaks, particularly in some of the South American genera, have the beak enormously thickened, while in the Long-spurs and Snow-flakes it is small and rather slender. Brightly colored forms are, however, not wholly wanting, examples of

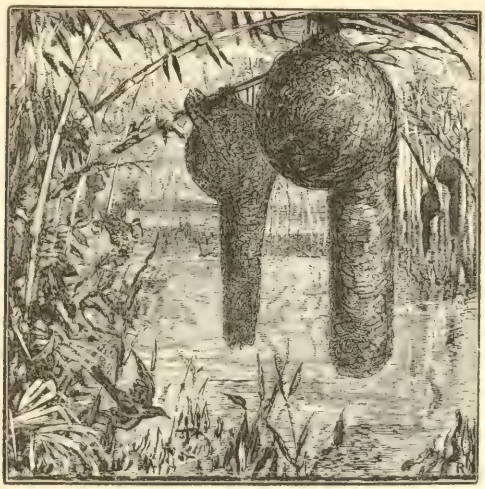

Fig. 16. Nests of African Weaver Birds.

which being the Gold-finches, Cardinals, and Nonpareils (see Case B). Many of the Sparrows and Finches are among the most familiar birds of nearly all countries, and not a few are highly prized for their songs. Being mostly hardy, seed-eating species they thrive well in confinement and form favorite cage-birds.

The Weaver-birds (*Ploceidæ*) are closely allied to the Sparrows and Finches in general features—differing mainly in having ten primary wing feathers instead of nine—but as a whole are more brightly colored and some are otherwise more strikingly marked, as the Vida-Finches or Widow-Finches of Africa, by

their enormously lengthened tail-feathers (see Case S). The two hundred and fifty species of this tropical Old World family are mainly confined to Africa, with a few species distributed eastward

Fig. 17. Honey Creeper (*Certhiola flaveola*).

through India to Australia. The Weavers are well known for their extraordinary nest-building (see Fig. 16).

The Tanagers (*Tanagridæ*) form also a very large assemblage; they are strictly American birds, remarkable for the brilliancy of their plumage, and mostly tropical, only five or six of the three

hundred and fifty species reaching the United States, and only one, the Scarlet Tanager (see Case B and Group No. 29), reaching their northern border. Many of the tropical species (see Case F) present striking combinations of gorgeous coloring, while many others are as plainly attired as the Sparrows and Finches, which they sometimes closely resemble.

The Honey-Creepers and their allies (family *Cœrebidæ*) are closely allied to the Tanagers—in fact fairly grading into them ; they are not only strictly American but exclusively tropical, and vie (see Case F) with the finest of the Tanagers in brilliancy of plumage. They have slender bills, which they insert into flowers for insects, hopping and creeping about among the slender twigs with great agility (see Fig. 17).

The American Wood-Warblers (family *Mniotiltidæ*) are closely related both to the Honey-Creepers and the Tanagers, with which they closely intergrade, and of which they are to some extent the North American representatives. A few genera, however, reach the tropics, where one or two are exclusively represented. Of the hundred known species about seventy are found in the United States (see Case B) ; the rest (Case F) are tropical. Several of the leading northern forms are shown with their nests and eggs in the Group Collection (Groups Nos. 4–8 and 21–25).

An interesting group of semitropical Old World slender-billed Song-birds are the Honey-eaters (family *Meliphagidæ*)—about one hundred species, confined mostly to Australia and the Pacific Islands. (See Case S.) They are provided with brush-tipped tongues, enabling them to gather the honey which constitutes their food from the flower-cups of the Eucalypti. Some of them are curiously ornamented with tufts of yellow feathers on the sides, and with wattles at the base of the bill.

Allied to them are the Sun-birds (family *Nectariniidæ*), about two hundred species, widely distributed within the Old World tropics, but most numerously represented in Africa (Case S). They rival the Hummingbirds of the New World in the splendor of their plumage, and, with their slender bills and similar styles of ornamentation, often closely resemble them in general appearance.

The Flower-peckers and their allies (family *Dicæidæ*), numbering about one hundred species, and closely related to the

Honey-eaters and Sun-birds, are mainly Indian and Australian, with a few representatives in Africa. They are small birds (see Case S), build beautiful purse-shaped nests, and are in some instances strikingly colored.

In the Swallows (family *Hirundinidæ*) we once more come to a cosmopolitan group of very familiar birds, numbering about eighty species, fairly exemplified by the half-a-dozen species found in the United States (Case B). (For the South American and Old World Swallows see Cases F and S.)

The Old World Flycatchers (family *Muscicapidæ*) are a very large assemblage (about four hundred species) of strictly Old World birds, made up of quite diverse forms, grading towards the Thrushes, and also towards some of the Babblers or Bulbuls. They have rather weak, broad, depressed bills, armed with bristles at the base. The Paradise Flycatchers have very long tails and are singularly variable in color according to age and sex. (See Case S).

The *Campephagidæ* is an allied family of exclusively Old World birds, numbering about one hundred and fifty species. It includes the Cuckoo-Shrikes, Minivets, and their allies, mostly of a more or less Shrike-like aspect, represented most numerously in the East Indies, Papuan Islands, and Australia. (See Case T.)

The Wax-wings (*Ampelidæ*) include two species of the genus *Ampelis*—both North American, one of them being also found in Northern Europe and Northern Asia—and a few other allied American genera. The Wax-wings proper derive their name from the wax-like appendages tipping the secondary wing-feathers. They are crested and have soft pleasing colors (see Case B).

The Wood-Swallows or Swallow-Shrikes (*Artamidæ*) are a small group of Shrike-like birds inhabiting Australia, of rather sombre tints and interesting habits (Case T).

The Drongo Shrikes (*Dicruridæ*), still more Shrike-like in general aspect, are mostly Indian, with a few representatives in Africa and Australia. They have forked tails and crow-black plumage (Case T).

The true Shrikes (*Laniidæ*) are mostly Old World birds, represented by a single genus in North America (Case B). They are characterized by their strong, hooked beaks and generally plain

gray colors, but some of the Old World forms are gorgeously attired (Case T). The Crow-Shrikes of Australia are large forms of this rather miscellaneous assemblage.

The Vireos (*Vireonidæ*) constitute a small family of distinctively American birds, well represented in North America by our well-known Vireos (see Case B, and Groups Nos. 9, 10, and 26), and in tropical America by several allied genera (Case F).

Fig. 18. American Water Ouzel and Nest.

The Tree-Creepers (*Certhiidæ*) number only about a dozen species, half of which occur in Australia, New Guinea, and neighboring islands, and the rest in North America, Europe, and the northern parts of Asia. Only the northern forms have the tail stiffened (see Cases B and T); in the Wall-Creeper and the Australian Creepers (Case T) the tail is of the ordinary form.

The Nuthatches (*Sittidæ*) are a small family of climbing birds, confined mostly to the temperate and colder portions of the

Northern hemisphere. They number about twenty species, four of which are North American (Case B), and the others European and Asiatic (Case T).

The true Titmice (family *Paridæ*) range throughout the temperate and colder portions of the Northern hemisphere, of which nearly one-third occur in North America (Case B). Other forms frequently associated with them occur in Africa, Australia, and New Zealand (Case T). Altogether the group numbers about eighty species.

The Water-Ousels or Dippers (family *Cinclidæ*) are birds of very peculiar form, they being "water-birds" and expert divers. Their short, concave wings and stumpy tail give them somewhat the form of Wrens. They inhabit mountain torrents, diving to the bottom for their food, and build large domed nests. (See Fig. 18.) Only twelve species are known, all belonging to one genus; three are found in the Andes of South America, and others in the mountains of Central America, the Rocky Mountains, and in the mountains of Northern Europe and Northern Asia (see Cases B, F, and T).

The numerous Wrens, Mockingbirds, Thrashers, and their allies constitute the large family *Troglodytidæ*. The Wrens, alone numbering nearly one hundred and fifty species, reach by far their highest numerical development in the warmer parts of the New World, to which several of the largest genera are restricted, and where about two-thirds of the species are found (see Case F). A few species occur in Europe and Asia (Case T). The Mockingbirds, Thrashers, and certain allied forms, constituting the subfamily *Mimina*, are all American, and number about fifty species. Of the sixteen species of Mockingbirds (see Case F), one only reaches the United States, and may be taken as a fair illustration of the group (see Case B). The Thrashers have a single representative in the eastern United States in our well-known Brown Thrush or Brown Thrasher (see Group No. 3), but the group finds its metropolis in the arid regions of the Southwest, where three-fourths of the species occur (see Case B). The Catbird, a near ally of the Mockingbirds and Thrashers, is shown in Group No. 22.

The Golden Orioles (*Oriolidæ*) of the Old World bear a general

resemblance in color to the New World Orioles, but the resemblance scarcely extends further. About forty species are recognized, which are variously distributed from Africa to Australia (see Case T). The color of most of the species is golden-yellow and black.

The so-called family *Timeliidæ* forms a large assemblage of Old World birds, composed of a great variety of more or less Thrush-like and Wren-like forms, including the Bull-bulls, Babbling Thrushes, etc. They are mostly of rather plain colors, but some are strikingly marked with contrasting tints. Such diverse forms have been combined in this extensive and heterogeneous group that it has often been termed the "ornithological waste-basket," in which are thrown such genera of Song-birds as are not easily arranged elsewhere, and do not seem to present sufficient differences to warrant their separation into groups of family value. The birds thus associated are especially numerous in India and Africa (see Case T).

The great family of the Thrushes (*Turdidæ*), as at present constituted, includes several groups formerly regarded as families, and by some writers still so regarded ; yet these different groups are found to so gradually merge into each other that they can scarcely be regarded as distinct families. These groups include the Old World Warblers (subfamily *Sylviinæ*), the Stonechats and and Bluebirds (*Saxicolinæ*), the Solitaires (*Myiadestinæ*), and the Thrushes proper (*Turdinæ*). The true Thrushes are cosmopolitan in distribution, and number about one hundred and fifty species (Cases B, F, and T). Two of the three leading genera are well illustrated by our Robin (*Merula migratoria*) and Wood Thrush (*Turdus mustelinus*) (Case B, and Groups Nos. 1, 2, and 20). The Ground-Thrushes (genus *Geocichla*) —some forty species—are all Old World, and most numerous in the East Indies and Australia (Case T). The Solitaires are largely West Indian (Case F), but have a single representative in the western United States. The true Stonechats (genus *Saxicola*) are with one exception, the Wheatear, all Old World and especially African (see Case T). Our familiar Bluebirds (genus *Sialia*—see Group No. 19) are near allies of the Stonechats ; the three species are all North American (Case B). Quite nearly related to the latter are the English

Robin, and the Nightingales (Case T). The true Warblers are nearly all Old World species (Case T); they include not only the familiar European White-throated, Garden, Orphean, and Black-capped Warblers and their numerous near allies (genus *Sylvia*), the great group of Willow-Warblers (genus *Phylloscopus*), the Tree-Warblers (genus *Hypolais*), the Reed-Warblers (genus *Acrocephalus*), but also the Grass-Warblers (genus *Lusciniola*) and the Superb Warblers of Australia (Case T).

The family as a whole includes not less than four hundred species, and comprises a large part of the most familiar and celebrated of the Song-birds, and by general consent has been placed at the head of the whole Class of Birds.

THE BIRD GROUPS.

The collection of Bird Groups, nearly forty in number, is a feature of the Bird Collection at present unique, so far as American museums are concerned, the only other similar collection being in the South Kensington Museum in London. In these groups an attempt is made to illustrate the most interesting phase of bird life—the nesting habits of the species—by actual facsimiles from life ;—by transferring to the Museum the branch on which the nest is built, and reproducing each leaf, flower, and twig artificially with the greatest accuracy as to all its details of color, size, and position, and substituting it for the perishable natural one ; or, in case of ground-nesting species, by taking a square yard of the original sod, with all its varied vegetation, and reproducing it with all possible care and accuracy. The nests, in most cases, have never been removed from where the birds placed them, whether on the ground or on a branch ; and for the most part the birds shown are the pair which constructed the nest.

Each group is provided with a descriptive label, stating when and where it was taken, and giving a brief statement of the habits and habitat of the species.

The materials for the groups, including the birds, their nests, and the accompanying accessories, were gathered, with few exceptions, by Mr. Jenness Richardson (in charge of the Department of Taxidermy), who also designed the groups. The effective modelling of the accessories—the plants, flowers, and foliage—is the work of Mrs. E. S. Mogridge and her brother, Mr. H. Mintorn, both formerly of the South Kensington Museum, where similar work by them attracted the attention of Mr. Jesup, President of the American Museum, and inspired him with a desire to have a series of groups of our common native birds similarly represented.*

* This method of illustrating birds and bird architecture being novel, a statement of how it originated may be of interest. In 1877 Mr. Theodore Walker, of Leicester, England, having a Pheasant's nest taken on his estate, sent to Mr. Mintorn and his sister, Mrs. Mogridge, then of 33 Soho Square, London, to have the surroundings modelled. These consisted of primroses, bluebells, ferns, grasses, etc. The nest on being thus completed was sent as a present to the British Museum. The novelty of the idea and the beauty of the work at once interested the Museum authorities, who thereupon engaged the Mintorns to model the surroundings of the

The unfaltering liberality of Mrs. Robert L. Stuart, who has so often befriended the Museum in its needs, fortunately rendered such an undertaking feasible, she generously volunteering to defray the costs of the groups now exhibited.

The first series of groups, numbered on the labels 1 to 18, was placed on exhibition May 10, 1887; they are arranged in the alcoves, beginning with No. 1, the Robin, at the north end of the west side of the Hall, and ending with the Clapper Rail Group, in the second alcove (from the south end) on the east side. The second series of groups, numbered 19 to 37, was placed on exhibition May 8, 1888. A part are in the alcoves on the east side of the Hall, and the remainder form a series down the middle of the Hall.

The very full labels accompanying the groups render a detailed account of each unnecessary in the present connection. Thirty-seven species are represented, selected from among the more common species found in the immediate vicinity of New York City. They have been chosen with the view of illustrating the nesting habits of species widely differing in respect to their styles of architecture and general domestic arrangements. Thus far the Song-birds greatly predominate over the Water Birds, the Grouse, and Birds of Prey, but it is expected to add from time to time further representatives of these latter groups.

Of the species now represented four belong to the Thrush family (*Turdidæ*), two to the Wren family (*Troglodytidæ*), nine to the family of Warblers (*Mniotiltidæ*), three are Vireos (family *Vireonidæ*), one is a Tanager (family *Tanagridæ*), two are Swallows (*Hirundinidæ*), nine are Finches and Sparrows (family *Fringillidæ*), two are Orioles (family *Icteridæ*), two are Flycatchers (family *Tyrannidæ*), one is a Cuckoo (family *Cuculidæ*), one an Owl (family *Strigidæ*), and one is a Rail (family *Rallidæ*), as follows:

LIST OF THE GROUPS.

Family TURDIDÆ.

Bluebird (*Sialia sialis*).—No. 19.

American Robin (*Merula migratoria*).—No. 1.

large series of bird groups now shown in the South Kensington Museum. The American Museum, when about to undertake similar work, fortunately found Mrs. Mogridge residing in this city, and arranged with her to do the modelling for the groups now on exhibition here.

Wood Thrush (*Turdus mustelinus*).—No. 2.
Wilson's Thrush (*Turdus fuscescens*).—No. 20.

Family TROGLODYTIDÆ.

Catbird (*Galeoscoptes carolinensis*).—No. 22.
Brown Thrasher (*Harporhynchus rufus*).—No. 3.

Family MNIOTILTIDÆ.

Black-and-White Creeper (*Mniotilta varia*).—No. 23.
Worm-eating Warbler (*Helmitherus vermivorus*).—No. 7.
Blue-winged Yellow Warbler (*Helminthophila pinus*).—No. 21.
Yellow Warbler (*Dendroica æstiva*).—No. 4.
Prairie Warbler (*Dendroica discolor*).—No. 24.
American Redstart (*Setophaga ruticilla*).—No. 5.
Maryland Yellow-throat (*Geothlypis trichas*).—No. 25.
Oven-bird (*Seiurus aurocapillus*).—No. 8.
Louisiana Water-Thrush (*Seiurus motacilla*).—No. 6.

Family VIREONIDÆ.

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Family TANAGRIDÆ.

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Family HIRUNDINIDÆ.

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Family TYRANNIDÆ.

Kingbird (*Tyrannus tyrannus*).—No. 35.
Acadian Flycatcher (*Empidonax acadicus*).—No. 34.

Family CUCULIDÆ.

Yellow-billed Cuckoo (*Coccyzus americanus*).—No. 36.

Family STRIGIDÆ.

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Family RALLIDÆ.

Clapper Rail (*Rallus longirostris crepitans*).—No. 18.

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